

MATERIALS METHODS OF BUILDING CONSTRUCTION - 04

NAME	BHARATH PATIL.S
USN	1AAR3AT012
SUB	MMBC - 04
SEM	04
COLLEGE	ANRUSA

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INTRODUCTION TO RCC MOMENT FRAMES

REINFORCED CONCRETE MOMENT FRAMES ARE STRUCTURAL SYSTEMS DESIGNED TO RESIST LATERAL AND GRAVITY LOADS USING A COMBINATION OF BEAMS AND COLUMNS.
COMMONLY USED IN HIGH-RISE BUILDING, BRIDGES AND EARTHQUAKE-RESISTANT STRUCTURES.

ADVANTAGES

- * STRENGTH AND DURABILITY
- * FLEXIBILITY AND DUCTILITY
- * DESIGN VERSATILITY
- * COST EFFECTIVENESS
- * FIRE RESISTANCE

DISADVANTAGES

- * LIMITED RENOVATION FLEXIBILITY
- * MAINTENANCE
- * ENVIRONMENTAL IMPACT
- * HEAVIER WEIGHT
- * CORROSION OF STEEL REINFORCEMENT



TOKYO SKYTREE

ARCHITECT

NIKKEN SEKKI



SYDNEY HARBOUR BRIDGE

ARCHITECT

JOHN JOB CREW BROADFIELD



TAIPEI TAIWAN

ARCHITECT

LEE & PARTNERS

BRACING SYSTEM

THE BRACING SYSTEMS ARE NECESSARY FOR STRUCTURE THAT ARE SUBJECTED TO LATERAL LOADS DUE TO EARTHQUAKE, WIND ETC... THEY HELP IN MINIMIZING THE LATERAL DEFLECTION OF THE STRUCTURE.

TYPES OF BRACING SYSTEMS

HORIZONTAL BRACING SYSTEM # VERTICAL BRACING SYSTEM



V - BRACING



INVERTED V-BRACE



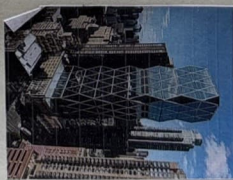
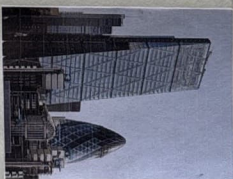
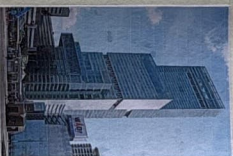
DIAGONAL BRACE



X - BRACING



K - BRACING



BUILDING NAME -

1. AGHO HARIKHS

2. THE LEADENHALL

3. HEARST TOWER

4. ONE MARITIME PLAZA

5. GALLERY BRACING BUILDING

ARCHITECT NAME -

CEGAR FELT

RICHARD ROGERS

JOSEPH URBAN

SKIDMORE, OWINGS

LIFE ARCHITECTS

METHODS OF RCC MOMENT FRAMED CONSTRUCTION

1. CAST IN SITE METHOD

FRAME IS SET UP, REINFORCEMENT IS PLACED, AND CONCRETE IS POURED ON SITE.

TIME - CONSUMING BUT OFFERS FLEXIBILITY IN DESIGN MODIFICATIONS.

ADVANTAGES

STRENGTH

COST EFFECTIVENESS

INSULATION

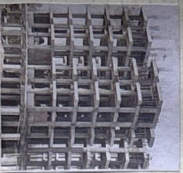
VERSATILITY

SMOOTHER FINISH

DISADVANTAGES

LABOR INTENSIVE

TIME INTENSIVE



2. PRECAST CONSTRUCTION

STRUCTURAL MEMBERS ARE PRE-MANUFACTURED AND ASSEMBLED ON-SITE.

REDUCES CONSTRUCTION TIME AND IMPROVES QUALITY CONTROL.

ADVANTAGES

SAFER CONSTRUCTION

QUALITY ASSURANCE

AESTHETICS

DURABILITY

COST - EFFECTIVE

DISADVANTAGES

HIGH INITIAL INVESTMENT

TRANSPORTATION ISSUE

HANDLING DIFFICULTIES



3. MONOLITHIC CONSTRUCTION

INTEGRATES SHEAR WALLS WITH MOMENT FRAMES FOR ADDITIONAL LATERAL LOAD RESISTANCE.

COMMON IN EARTHQUAKE-PRONE ZONES.

ADVANTAGES

IMPROVED STRUCTURAL

SEAMLESS JOINTS

TIME AND COST EFFECTIVE

ENHANCED AESTHETIC

BETTER INSULATION

DISADVANTAGES

LIMITED DESIGN FLEXIBILITY

HIGH INITIAL COSTS

COMPLEXITY IN CONSTRUCTION

HEAVY EQUIPMENT

SKILLED LABOUR.



RCC MOMENT FRAMES

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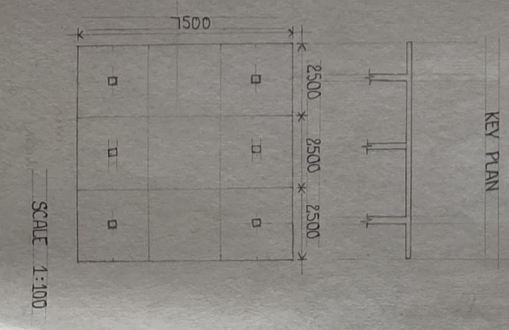
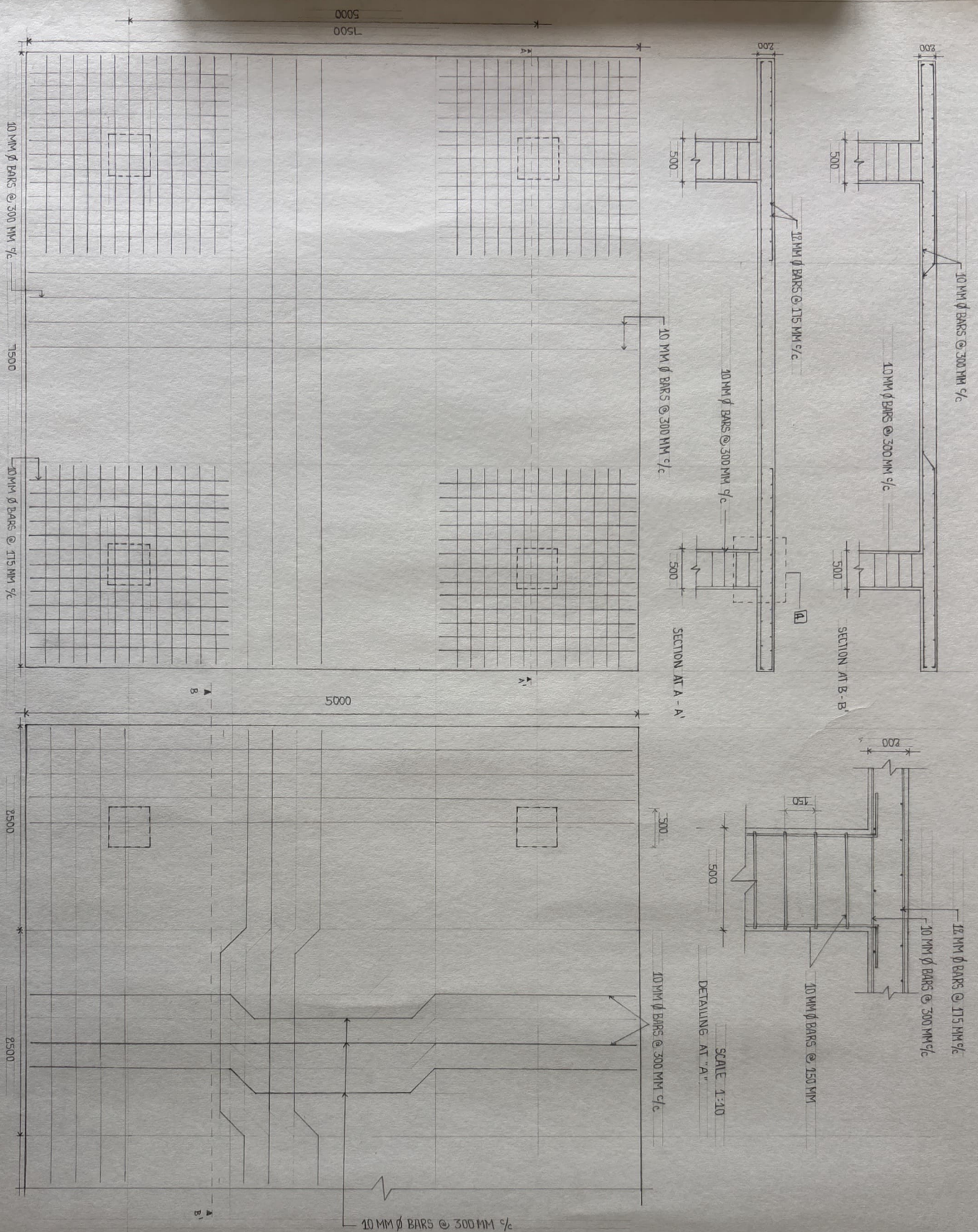
SUB MIBC - IV

SEM 04

COLLEGE ANRVSA

11/11/24

FLAT PLATE



INTRODUCTION

Flat Plate Slab

A FLAT PLATE IS A ONE - OR TWO WAY SLAB SYSTEM USUALLY SUPPORTED DIRECTLY ON COLUMNS OR LOAD BEARING WALL. IT IS ONE OF THE MOST COMMON FORMS OF CONSTRUCTION OF FLOORS IN BUILDINGS.

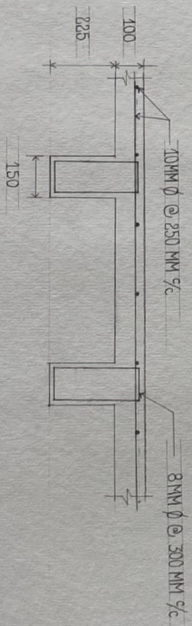
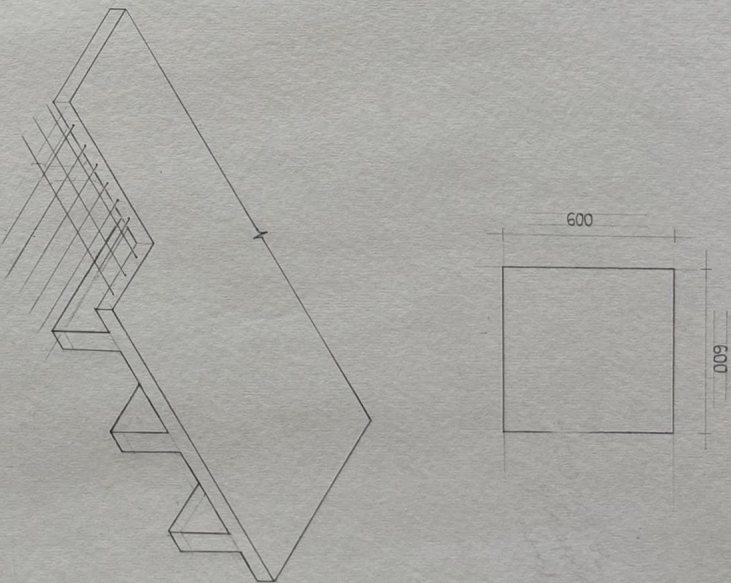
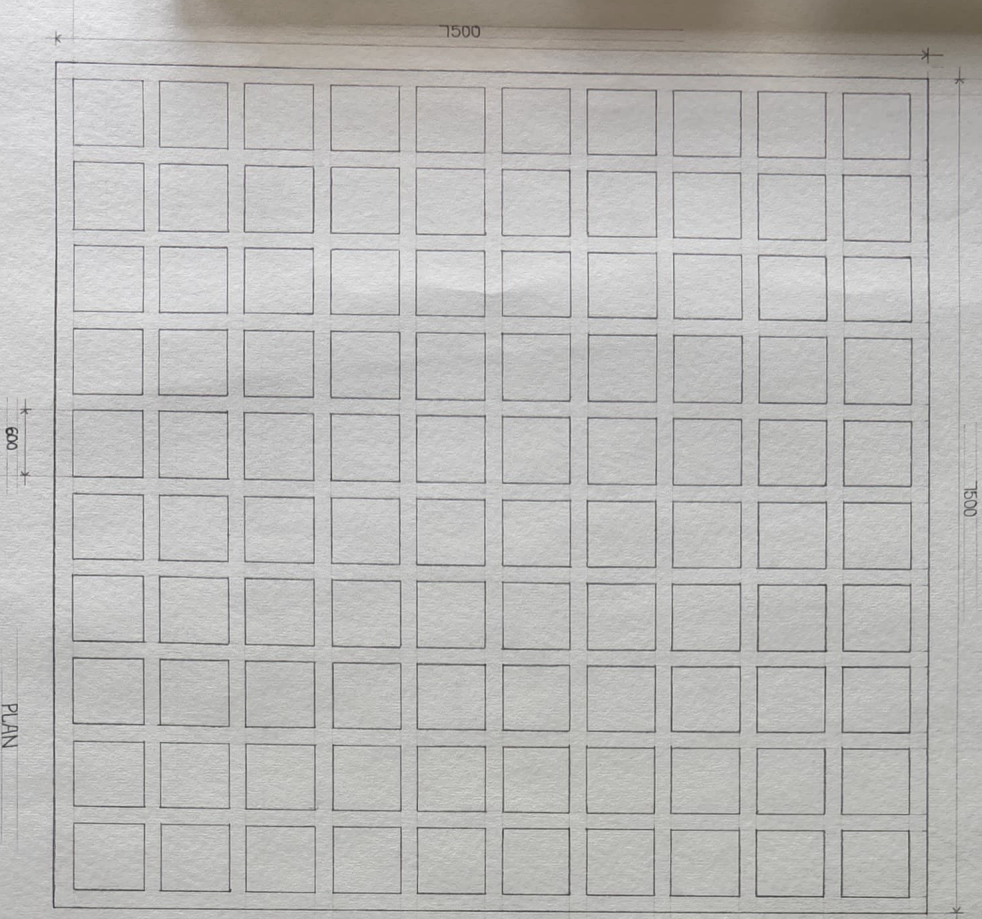
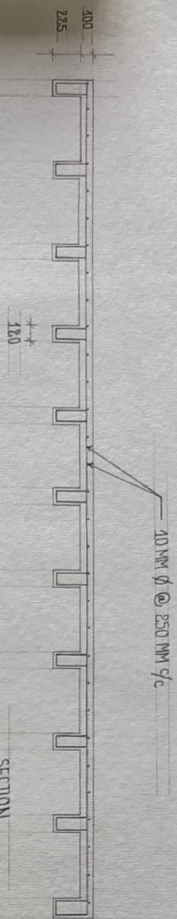
ADVANTAGES

- FLEXIBILITY IN ROOM LAYOUT
- REINFORCEMENT PLACEMENT EASIER
- EASE OF FRAMEWORK INSULATION
- LESS CONSTRUCTION TIME
- BUILDING HEIGHT CAN BE REDUCED.
- AUTO SPRINKLE IS EASIER.

DISADVANTAGES

- SPAN LENGTH IS MEDIUM
- NOT SUITABLE FOR SUPPORTING BRITTLE CRITICAL MIDDLE STRIP DETECTION.
- HIGHER SLAB THICKNESS.

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SEM 04		
COLLEGE ANRVSA		



SCALE 1:25
ALL DIMENSIONS ARE IN MM

WAFFLE SLAB

WAFFLE SLAB
WAFFLE SLAB IS A STRUCTURAL COMPONENT WHICH IS PLAIN ON ITS TOP AND CONTAINS GRID LIKE SYSTEM ON ITS BOTTOM SURFACE.
WAFFLE SLAB HAS TWO DIRECTIONAL REINFORCEMENT.

CHARACTERISTICS
WAFFLE SLABS ARE GENERALLY SUITABLE FOR FLAT AREAS.
VOLUME OF CONCRETE USED IS VERY LESS COMPARED TO OTHERS.
THE REINFORCEMENT IN THE WAFFLE SLAB IS PROVIDED IN THE FORM OF MESH OR INDIVIDUAL BARS.
SEPARATE EXCAVATION FOR BEAMS IS NOT REQUIRED IN CASE OF WAFFLE SLAB.

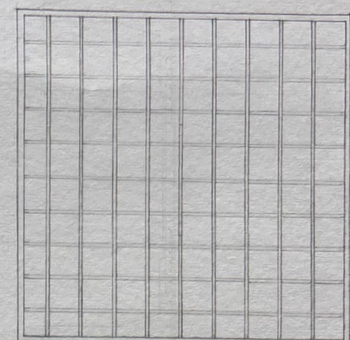
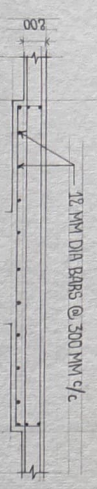
CONSTRUCTION PROCEDURE
IN - SITU
PRE CAST
PREFABRICATED

FORMWORK Tools Required
WAFFLE PODS
HORIZONTAL SUPPORTS
VERTICAL SUPPORTS
WALL CONNECTORS
CUBE JUNCTIONS
HOLE PLATES
CLIPS
STEEL BARS

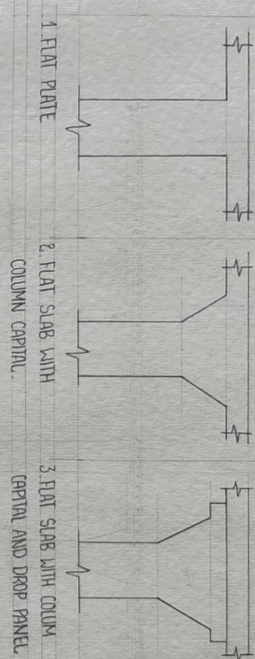
ADVANTAGES
SAVINGS ON WEIGHT AND MATERIALS.
GOOD VIBRATION CONTROL CAPACITY
LIGHT WEIGHT

DISADVANTAGES
REQUIRE GREATER FLOOR TO FLOOR HEIGHT.
DIFFICULTY IN MAINTENANCE
NOT SUITABLE IN HIGHLY WINDY AREA.

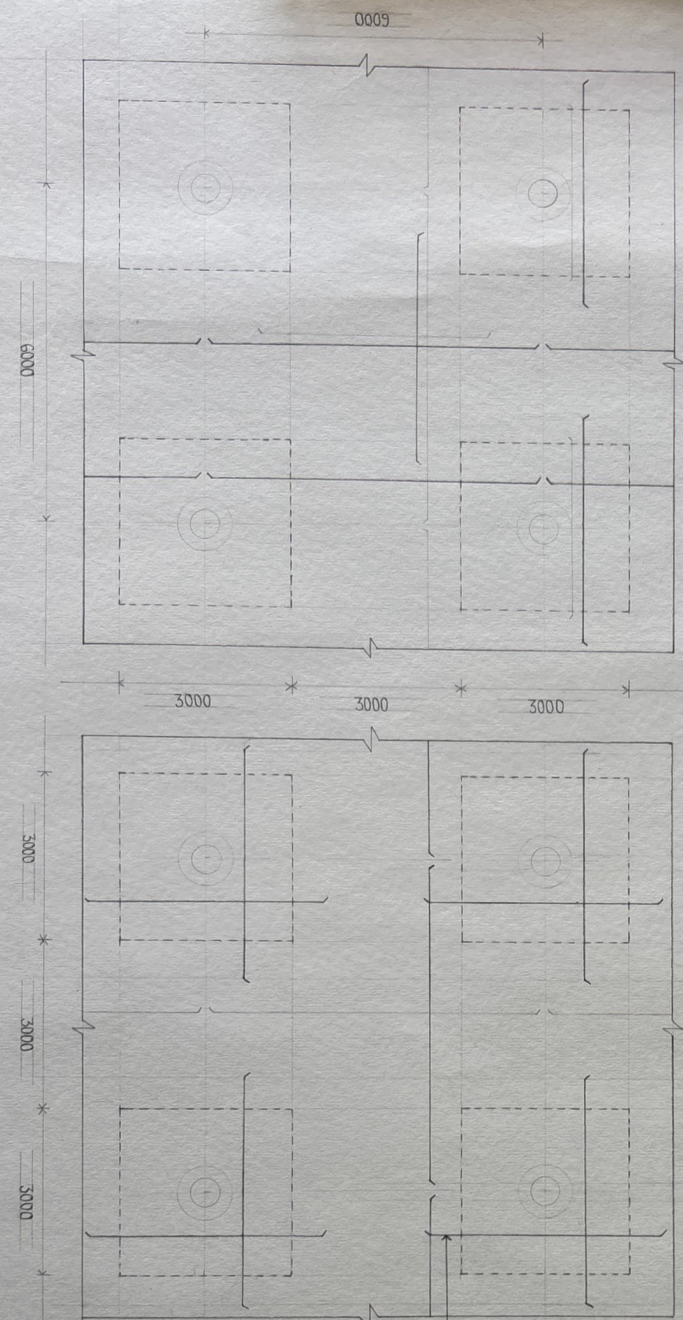
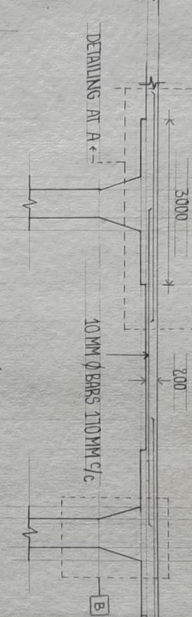
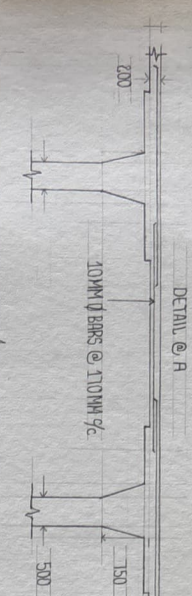
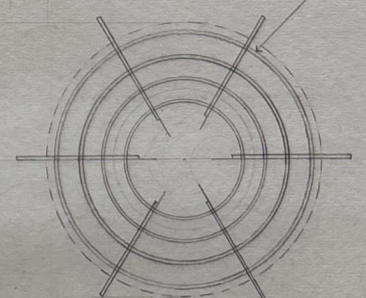
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SEM 04	
COLLEGE ANURUSA	



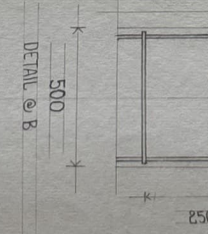
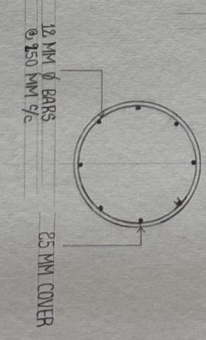
Types Of Flat Slabs



8 MM ϕ @ 150 MM φ c

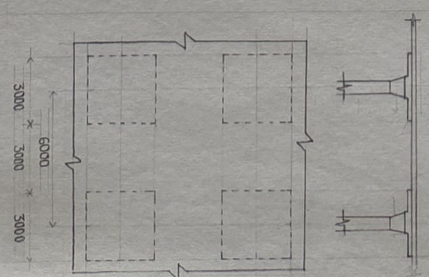


8 MM ϕ BARS @ 150 MM



1000

FLAT SLAB.
FLAT SLAB IS A TYPE OF REINFORCED CONCRETE WHERE THE SLAB IS SUPPORTED DIRECTLY BY COLUMNS WITHOUT THE USE OF BEAMS.
FLAT SLAB MEANS A REINFORCED CONCRETE SLAB THAT DIRECTLY RESTS ON COLUMN, TRANSFERS THE LOADS DIRECTLY TO THE SUPPORTING COLUMN.
THE MINIMUM THICKNESS OF FLAT SLAB IS 125 MM.
Use Of Column Heads.
SHEAR STRENGTH OF FLAT SLAB IS INCREASED BY USING COLUMN HEADS.
COLUMN HEADS REDUCE THE CLEAR OR EFFECTIVE SPAN.
Use Of Drop Panels.
DROP PANELS INCREASE THE SHEAR STRENGTH OF FLAT SLAB FLOOR.
THEY REDUCE DEFLECTION BY STIFFENING THE FLAT SLAB.



KEY PLAN

FLAT SLAB

SIGNATURE	NAME BHARATH PATIL S	SHEET NO
USN 1AAR3AT012		
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COLLEGE ANR/USA		

STRUCTURAL STEEL

A CATEGORY OF STEEL DESIGNED AND USED AS A CONSTRUCTION MATERIAL PARTICULARLY IN BUILDING AND BRIDGE CONSTRUCTION. DUE TO ITS HIGH STRENGTH TO WEIGHT AND COST EFFECTIVENESS.

TYPES OF STEEL

STEEL IS CATEGORIZED INTO FOUR MAIN TYPES :

CARBON STEEL

THIS IS THE MOST COMMON TYPE , CONSISTING PRIMARILY OF IRON AND CARBON . IT'S FURTHER CLASSIFIED BASED ON ITS CARBON CONTENT [LOW , MEDIUM OR HIGH] .

ALLOY STEEL

MADE BY ADDING OTHER ELEMENTS TO CARBON STEEL . THESE ADDITIONS IMPROVE SPECIFIC PROPERTIES LIKE STRENGTH , HARDNESS , AND CORROSION RESISTANCE .

STAINLESS STEEL

CONTAINS AT LEAST 10.5% CHROMIUM , WHICH PROVIDES EXCELLENT CORROSION RESISTANCE . DIFFERENT TYPES OF STAINLESS STEEL ARE FURTHER DIFFERENTIATED BASED ON THEIR CHEMICAL COMPOSITION , WITH 300 SERIES BEING THE MOST COMMON .

TOOL STEEL

DESIGNED FOR MAKING TOOLS AND CUTTING INSTRUMENTS , POSSESSING HIGH HARDNESS , WEAR RESISTANCE AND RESISTANCE TO DEFORMATION .

MANUFACTURING OF STEEL

STEEL MANUFACTURING TYPICALLY INVOLVES USING IRON ORE , COKE , AND LIMESTONE IN A BLAST FURNACE TO PRODUCE MOLTEN IRON , WHICH IS THEN CONVERTED INTO STEEL THROUGH PROCESSES LIKE BASIC OXYGEN STEEL MAKING OR ELECTRIC ARC FURNACES .

RECYCLE OF STEEL

1. STEEL PROCESS

2. FABRICATION

3. CONSTRUCTION

4. SCRAP



H - SHAPE SECTION	CHANNEL SECTION	UNEQUAL SECTION	EQUAL ANGLE SECTION	SQUARE HOLLOW SECTION	RECTANGULAR HOLLOW SECTION
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PROPERTIES OF STEEL

TENSILE STRENGTH

THE ABILITY OF STEEL TO WITHSTAND PULLING OR STRETCHING FORCES BEFORE BREAKING .

TOUGHNESS

THE ABILITY OF STEEL TO ABSORB ENERGY BEFORE FRACTURING . INDICATING IT'S RESISTANCE TO BRITTLE FRACTURE .

HARDNESS , DUCTILITY , YIELD STRENGTH , MALLEABILITY , WELDABILITY .

METHODS OF STEEL CONSTRUCTIONS

BOLTED CONNECTION

STEEL MEMBERS ARE JOINED USING BOLTS , A COMMON AND VERSATILE METHOD .

WELDED CONNECTIONS

JOINING STEEL MEMBERS BY FUSION WELDING , OFFERING STRONG AND DURABLE JOINTS .

RIVETED CONNECTIONS

HISTORICALLY USED , RIVETS ARE NOW LESS COMMON DUE TO THE DEVELOPMENT OF WELDING AND BOLTING TECHNOLOGIES .

REUSE AND RECYCLING OF STEEL

REDUCED ENVIRONMENTAL IMPACT

RECYCLING REDUCES ENERGY CONSUMPTION , GREEN HOUSE GAS EMISSIONS , AND WASTE GENERATION .

RESOURCE EFFICIENCY

RECYCLING CONSERVES VALUABLE RESOURCES , PROMOTING A CIRCULAR ECONOMY .

COST SAVINGS

RECYCLING CAN BE MORE COST - EFFECTIVE THAN USING NEW MATERIAL , ESPECIALLY WHEN CONSIDERING THE COSTS ASSOCIATED WITH MINING AND RAW MATERIAL PROCESSING .

GOVERNMENT INITIATIVES AND POLICIES IN STEEL

NATIONAL STEEL POLICY

AIMS TO INCREASE PER CAPITA STEEL CONSUMPTION AND PRODUCTION CAPACITY TO 300 MILLION TONNES BY 2030 .

PRODUCTION LINKED INCENTIVE

OFFERS INCENTIVES FOR SPECIALTY STEEL MANUFACTURING .

STEEL SCRAP RECYCLING POLICY

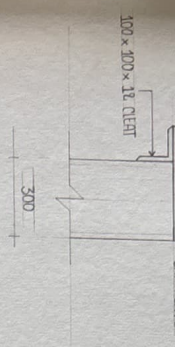
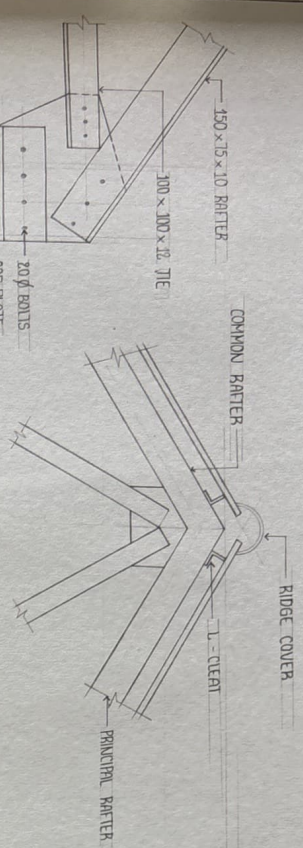
ENCOURAGES ORGANIZED COLLECTION AND RECYCLING OF SCRAP TO REDUCE IMPORT DEPENDENCY .

ENVIRONMENT PROTECTION GUIDELINES

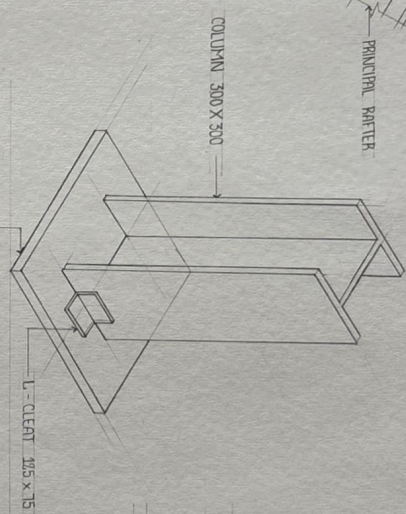
MANDATE POLLUTION CONTROL AND SUSTAINABLE PRACTICES IN STEEL MANUFACTURING .

INTRODUCTION TO STRUCTURAL STEEL

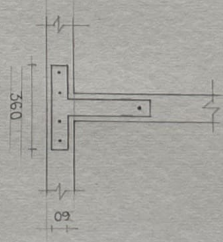
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USN	1AAR3AT1012
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COLLEGE	ANRUSA



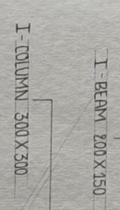
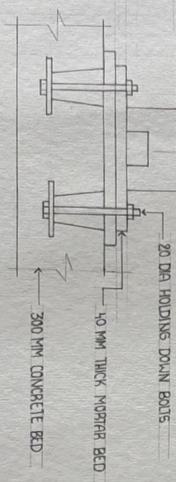
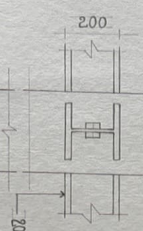
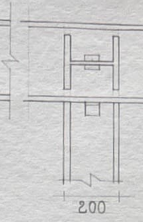
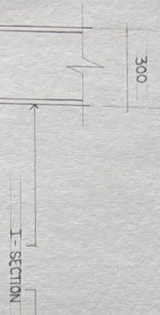
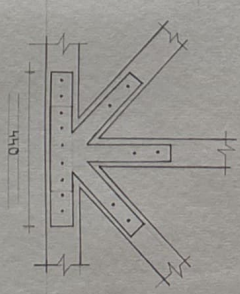
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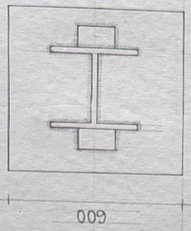
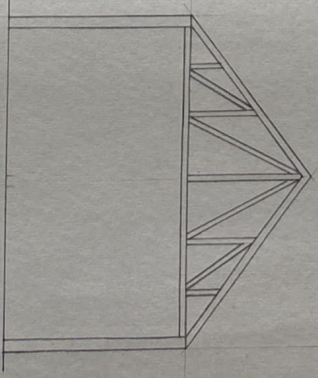
KEY PLAN



EAVE BRACKETS



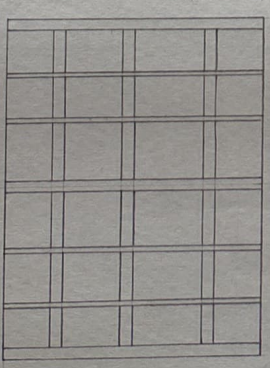
ELEVATION



SCALE 1:10
ALL DIMENSIONS ARE IN MM

BEAM TO BEAM

ISOMETRIC VIEWS



STEEL JOINERY

SIGNATURE NAME BHARATH PILLAI S

USN 1AAR3A1012

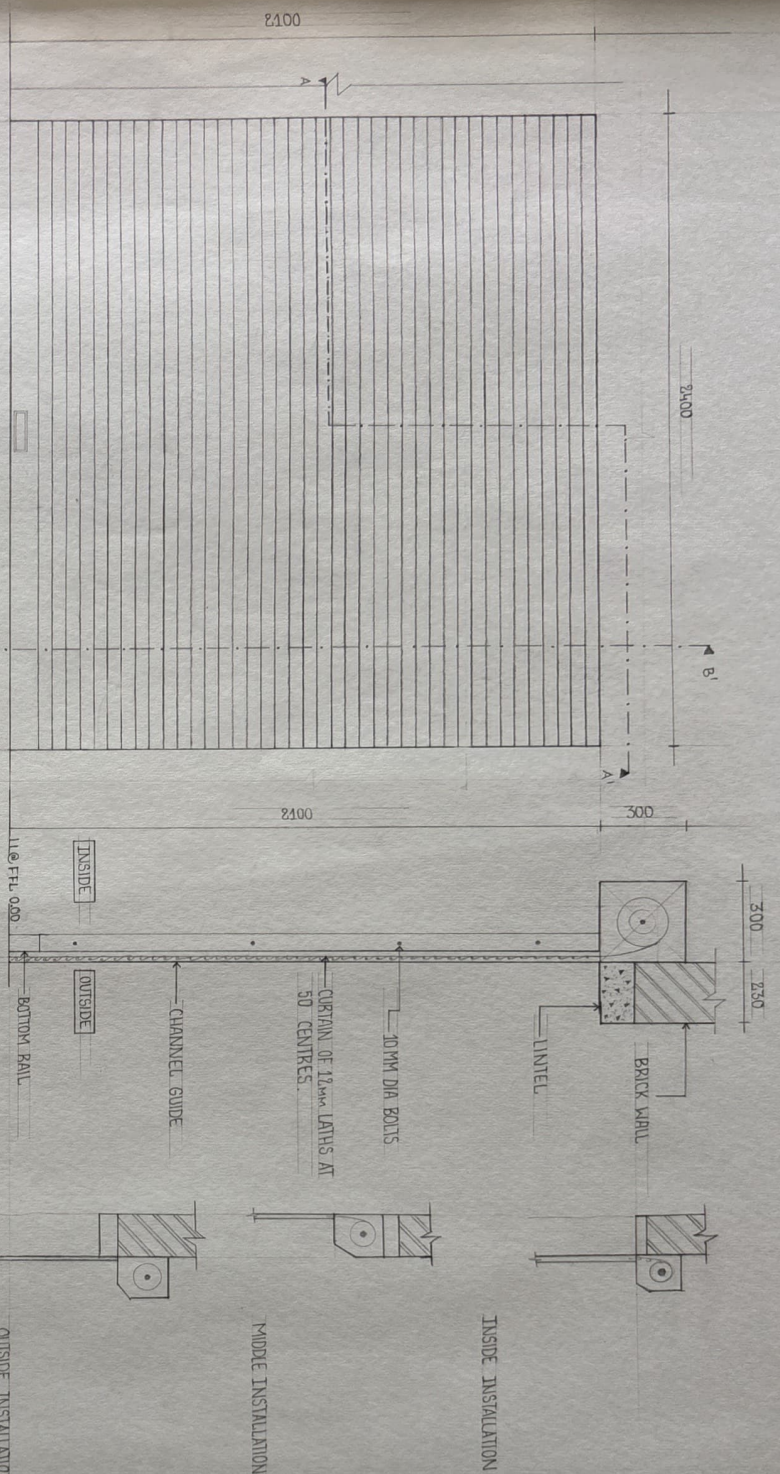
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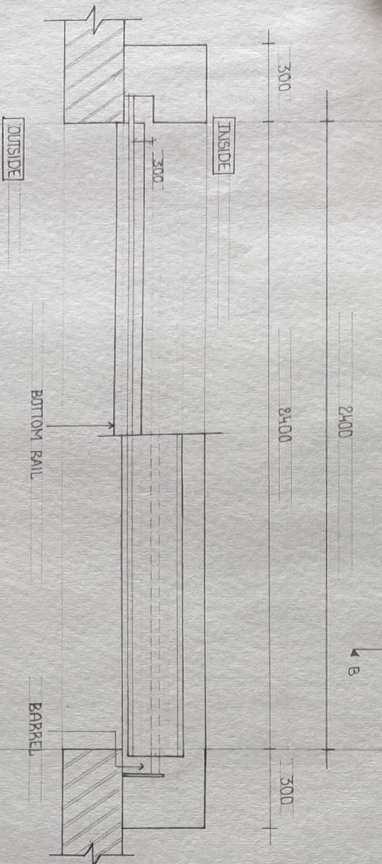
COLLEGE ANRUSA

SHEET NO

ALTERNATIVE SECTION



INSIDE INSTALLATION
MIDDLE INSTALLATION
OUTSIDE INSTALLATION

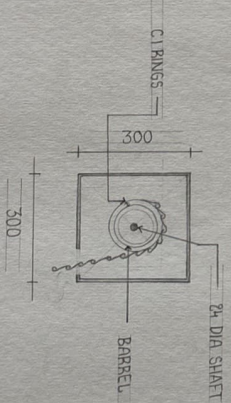


SECTIONAL PLAN A-A

SCALE 1:10
ALL DIMENSIONS ARE IN MM

DETAIL AT A

SCALE 1:15



Rolling Shutter INTRODUCTION

COMPONENTS

GUIDE RAIL

IT IS TO RETAIN THE SHUTTER CURTAIN AND ITS HAS RUBBING STRIP TO REDUCE FRICTION.

SHUTTER SPRING

IT IS MADE UP OF SPRING WIRE IT IS ALSO CALLED AS TORSION SPRING.

SHUTTER BOX

IT IS DESIGNED TO PROTECT THE ROLLER ASSEMBLY.

ROLLER

LATH

DIFFERENT TYPES OF OPERATING SYSTEM :

DOUBLE SIDE GEAR

SINGLE SIDE GEAR

MANUAL

CENTRE MOTOR

SIDE MOTOR

FEW TYPES OF ROLLING SHUTTER

MILD STEEL

GALVANIZED IRON

ALUMINIUM

PERFORATED

SIGNATURE NAME BHARATH PRATH S

SHEET NO

USN 1AAG3AT012

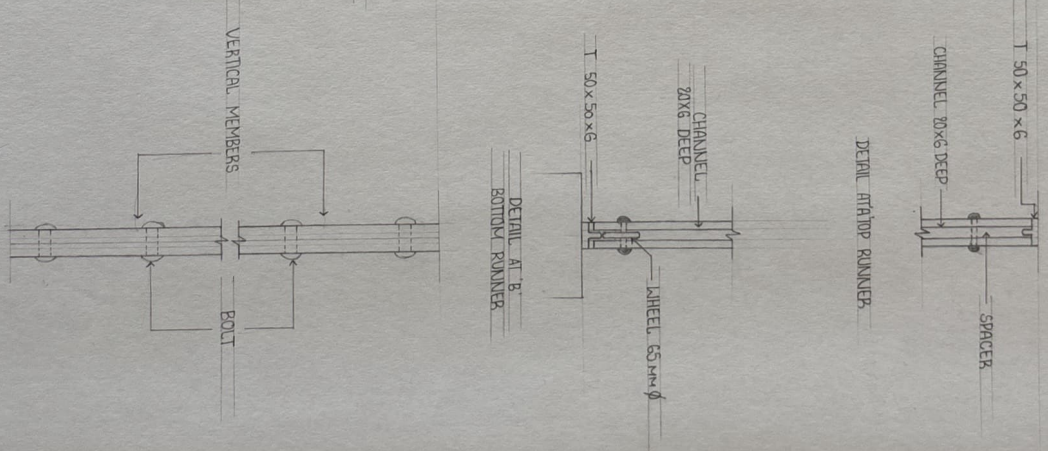
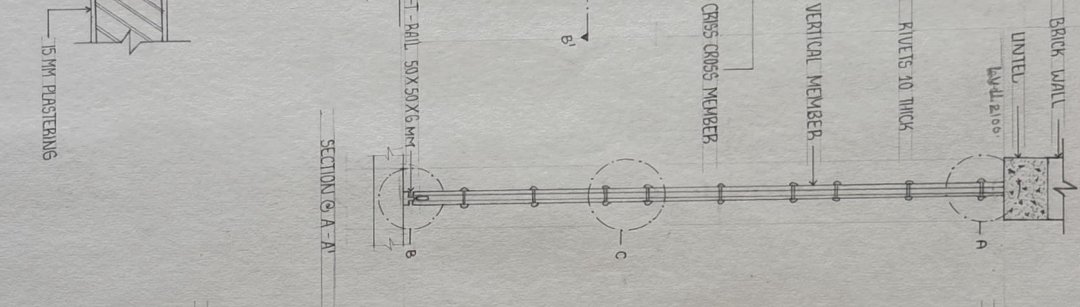
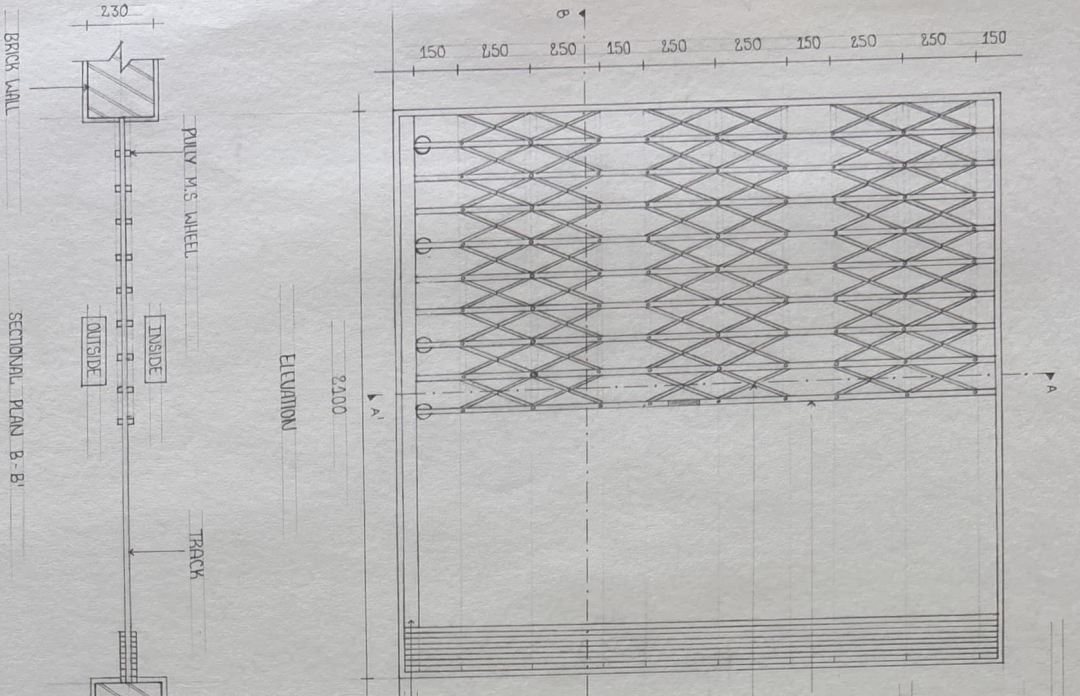
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SUB. MMBC - 04

COLLEGE ANKURVA

ROLLING SHUTTER

COLAPSIBLE GATE



SCALE : 1:10

ALL DIMENSIONS ARE IN MM

SCALE 1:20

Collapsible Gate

USED FOR SHOPS , GARAGE , PUBLIC BUILDING , GODDOWNS ETC...

USED FOR SAFETY , PROTECTION AND LARGER SPAN . ALSO USED IN PLACES WHERE LIGHT AND VENTILATION IS REQUIRED EVEN WHEN OPENING IS CLOSED .

SINGLE OR DOUBLE SHUTTERS

VERTICAL DOUBLE CHANNELS 20x10x2 MM AND SPACED 10 TO 12 MM APART .

THE CHANNELS ARE JOINED TOGETHER WITH THE HOLLOW OF CHANNEL ON THE INSIDE AND ARE BRACED WITH 10MM WIDE AND 5MM TK FLAT DIAGONALS .

THE SHUTTER OPERATES BETWEEN TWO T IRON RAILS 1 FIXED TO THE FLOOR OTHER TO THE UNITEL USING ANCHOR BOLT

SHUTTER SLIDES OVER THE ROLLER .

RIVETS AND MOVABLE RIVETS

Key Features

- # SECURITY
- # VISIBILITY
- # VENTILATION
- # FLEXIBILITY
- # CUSTOMIZATION
- # EASE OF STORAGE AND TRASPOT

BENEFITS

- # VERSATILITY
- # COST - EFFECTIVENESS
- # EASY TO INSTALL
- # AESTHETIC APPEAL

SIGNATURE

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SHEET NO

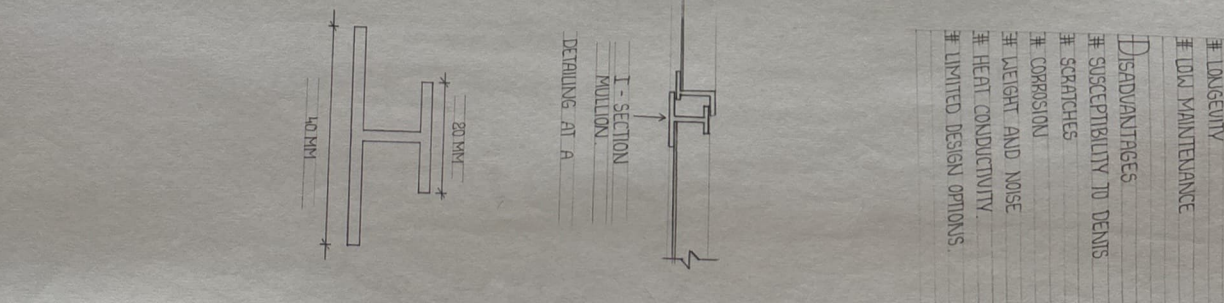
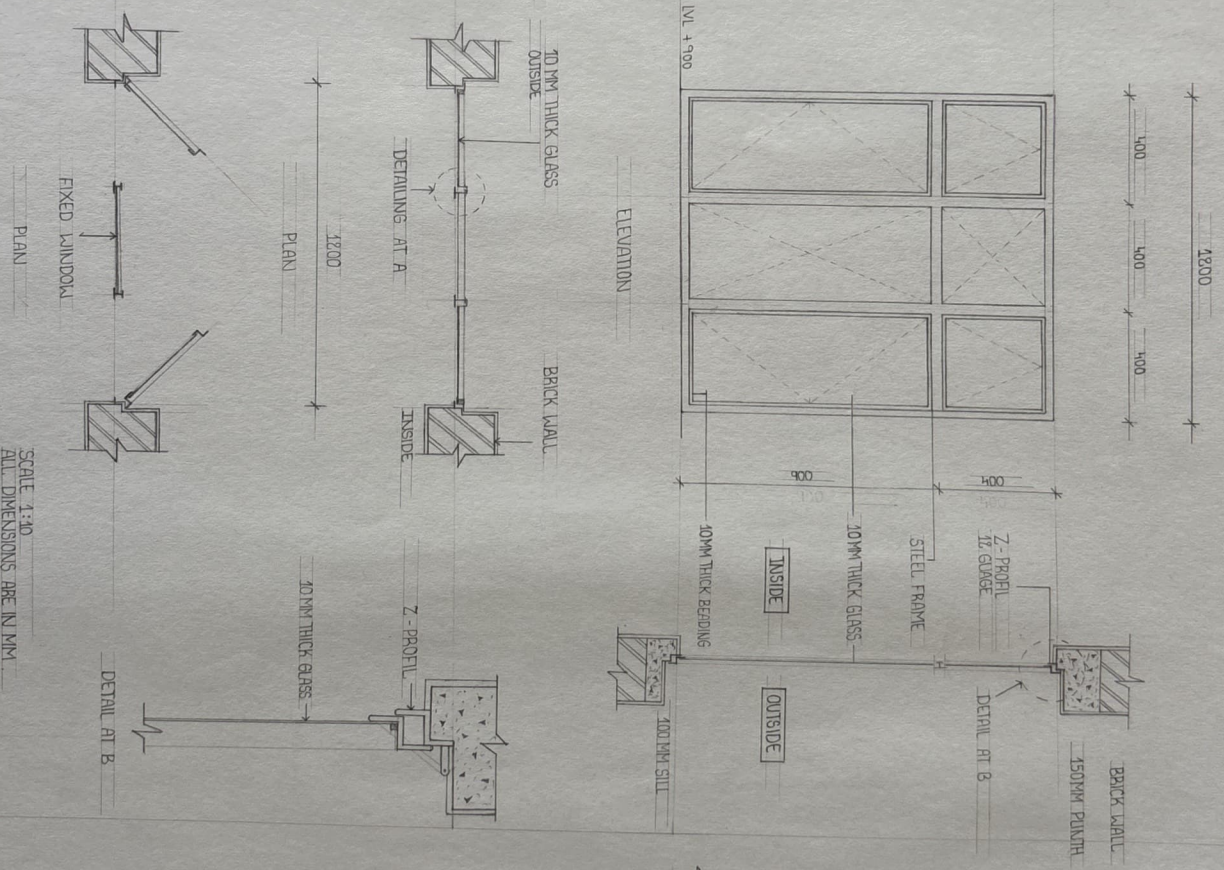
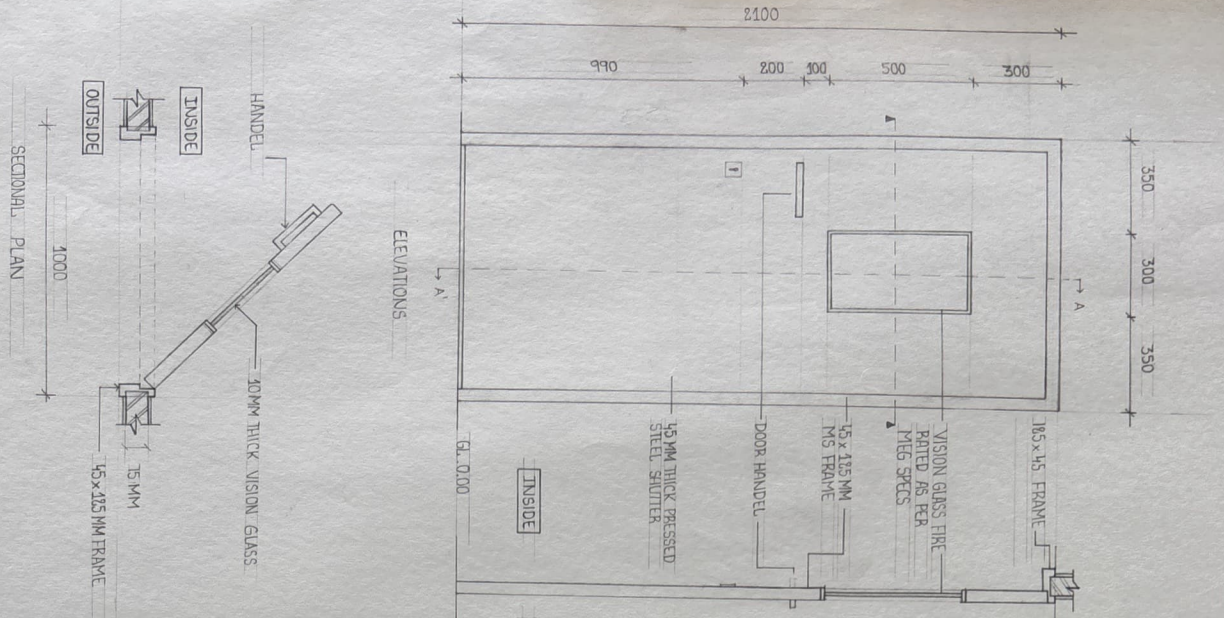
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SUB MMBG - 04

SEM 04

COLLEGE ANDRISA

STEEL DOOR AND WINDOW



- Advantages**
- # ENERGY EFFICIENCY
 - # SECURITY
 - # FIRE RESISTANCE
 - # LONGEVITY
 - # LOW MAINTENANCE
 - # SUSCEPTIBILITY TO DENTS
 - # SCRATCHES
 - # CORROSION
 - # WEIGHT AND NOISE
 - # HEAT CONDUCTIVITY
 - # LIMITED DESIGN OPTIONS

SIGNATURE _____

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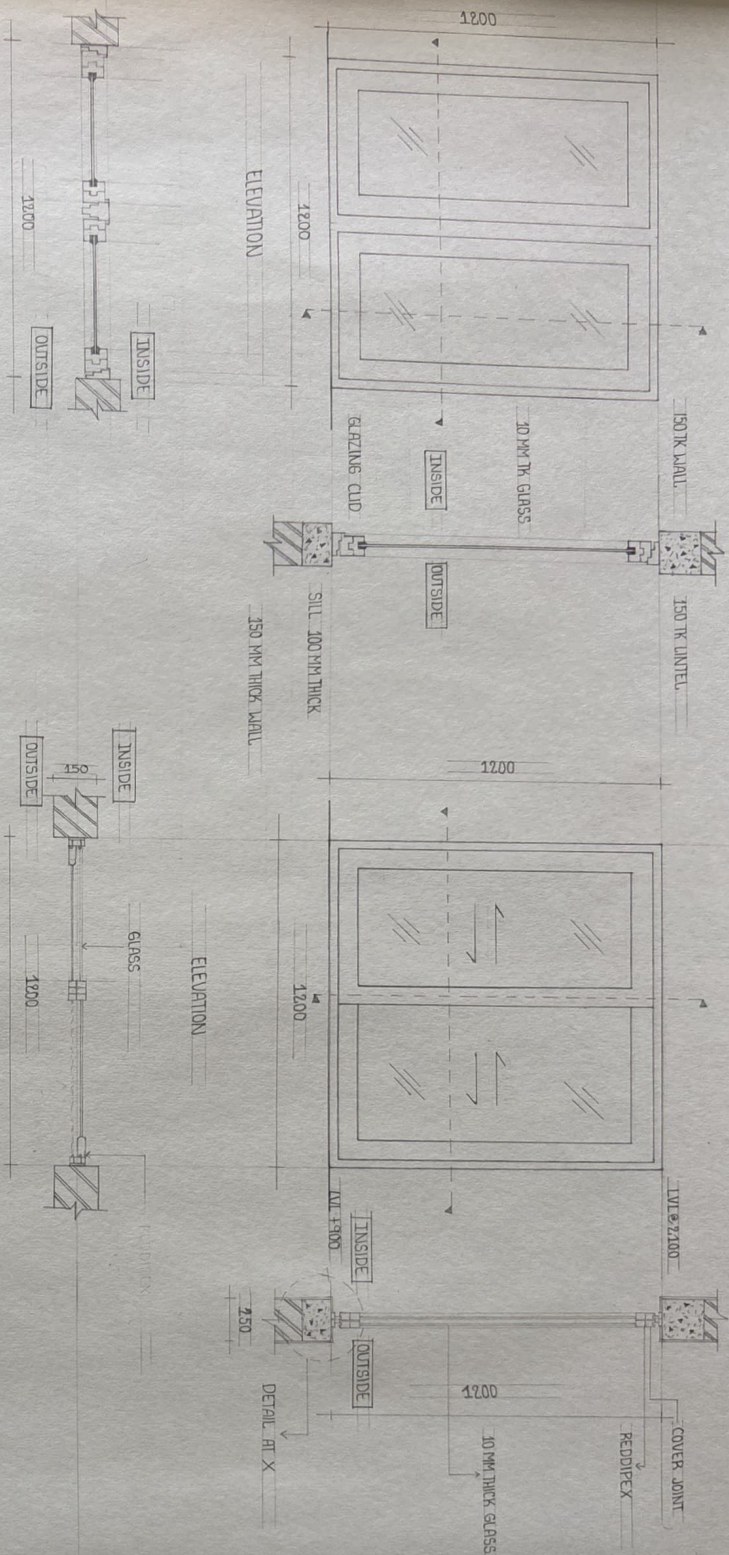
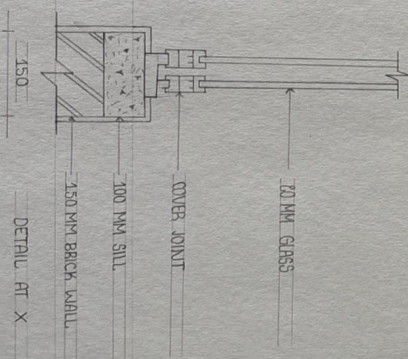
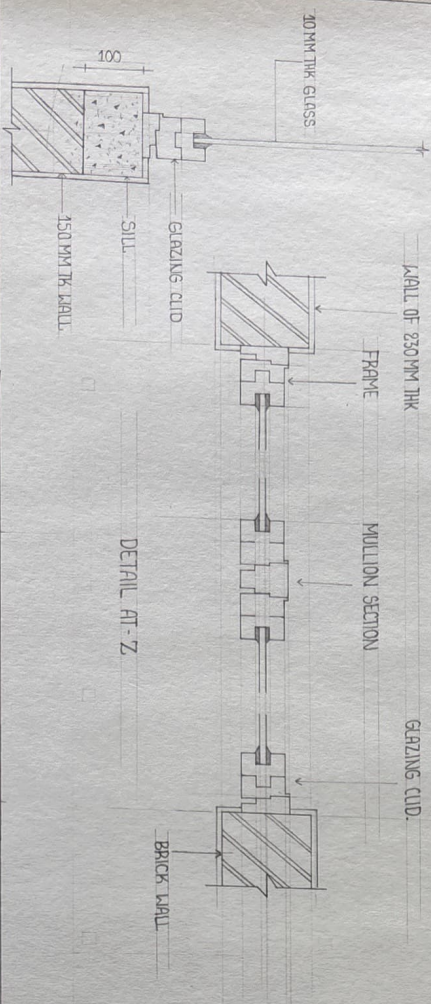
SEM 04

COLLEGE ANKUSA

SHEET NO _____

SCALE 1:10
ALL DIMENSIONS ARE IN MM

ALUMINIUM WINDOW



ALUMINIUM
A STANDARD ALUMINIUM WINDOW AND DOOR IS MADE OF EXTRUDED ALUMINIUM PROFILES.
ANODIZED COATING OR PAINTED FINISH HELPS TO PREVENT AGAINST RUSTING, PITTING AND CORRODING.
THESE PROFILES HAVE FLANGE, GROOVES FOR DOUBLE GLAZING AND WEATHER STRAPPING.
SECTIONS ARE WATER CUT AND MECHANICALLY CLEANED / SCREWED AT JOINTS WHICH ARE SEALED AGAINST ENTRY OF WATER.

Types Of Aluminium Window

- # SIDE - HUNG INWARD
- # SIDE - HUNG OUTWARD
- # TOP - HUNG OUTWARD
- # TILT AND TURN
- # PIVOT HORIZONTAL
- # SLIDING
- # PIVOT VERTICAL

Adv Aluminium

- # IT'S STRONGER
- # COMPARATIVELY LIGHTER.
- # RODENT PROOF
- # ECO FRIENDLY
- # HIGH SCRAP VALUE
- # HIGH LIFE SPAN.
- # REPAIRABLE AND RECYCLABLE

ADVANTAGES

- # DURABILITY
- # LOW MAINTENANCE
- # ENERGY EFFICIENCY.

DISADVANTAGES

- # CORROSION
- # HIGHER INITIAL COST
- # MAINTENANCE

SIGNATURE

NAME: BHARATH PATIL S

SHEET NO.

USN: 1A903A1012

SUB: MMC - 04

SEM: 04

COLLEGE: ANRUSA

27/01/25